# Licensing of Advanced Nuclear Energy Technologies

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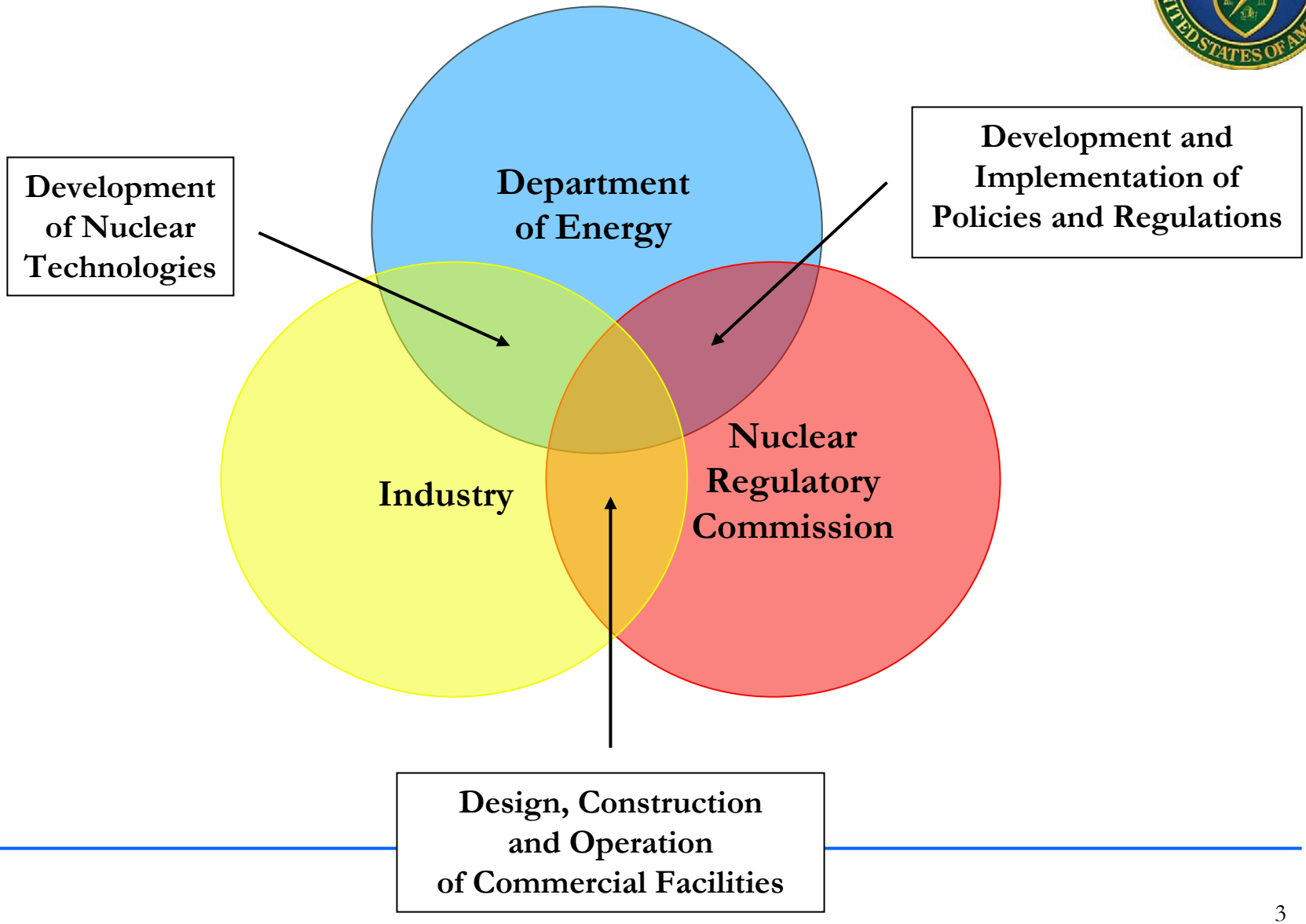
# Enabling Use of Advanced Nuclear Energy Technologies

- **U.S. Department of Energy**…advance energy security through development, demonstration and promotion of scientific and technological innovation…

- **U.S. Nuclear Regulatory Commission**…protect the public health and safety, promote the common defense and security, and protect the environment through regulation of nuclear technologies…

- **Industry**…commercialize new technologies and invest in and operate energy systems, including nuclear, as a responsible business…

# The Big Picture



# The Energy Future

- **The GOAL**: Improve energy sustainability and domestic energy security, reduce volatility of energy prices, while reducing environmental effects of energy production.

- **The Opportunity**: Increased use of nuclear energy

# Advanced Nuclear Energy Technologies

- Advanced Light Water Reactors
  - The new fleet for electric power generation
- Next Generation Nuclear Plant
  - High Temperature Gas-Cooled Reactors (HTGRs) for industrial process heat
- Advanced Fast Reactors
  - Fast neutron spectrum liquid metal-cooled reactors for actinide consumption and nuclear resource sustainability
- Fuel Recycling Facilities
  - Deployment of technologies that enable recycling and consumption of long-lived radioactive isotopes

# What are the Barriers to Deploying Advanced Technologies?

- Incomplete Technology Development
- Undefined Licensing Regime
- Cost Uncertainty

# Removing Licensing Barriers

- Must establish an efficient and effective regulatory approval process for siting and licensing non-LWR commercial nuclear facilities

- Build-off of lessons learned from Part 50 and Part 52 processes for LWRs

- Reduce regulatory uncertainties for first-time applications for advanced nuclear energy technologies

# Removing Financial Barriers

- Resolve licensing issues before project commitment
  - Prevent open-ended licensing process to avoid delays in construction and start of operation
- "Time to Market" is the key factor for economic competiveness
  - Long lead times prior to construction coupled with long construction times increase project risk and reduce economic competiveness

# Focusing on High-Temperature Gas-Cooled Reactors

- **Growing interest**—the hydrocarbon industry sees HTGRs as an alternative to fossil fuels to produce high-temperature process heat.

- **Developing business model**—dedicated modular HTGRs co-located with, and providing energy to, a hydrocarbon processing facility

**Can the nuclear enterprise (DOE, NRC & Industry) demonstrate that licensing of HTGRs can support a viable business alternative to fossil fuels?**

- The opportunity to use nuclear power in this business sector will be missed unless the nuclear enterprise can answer this question

# Action Required

- NRC and DOE, working together with industry, have a opportunity to develop and implement the policies and regulatory path for licensing advanced nuclear energy technologies that:
  - Ensure timely execution from a business perspective
  - Values innovative approaches to the regulatory process
  - Separates regulatory risk from commercial risk
- The development of the regulatory infrastructure for advanced nuclear energy technologies needs to occur as soon as practical
- NGNP licensing strategy report, mandated by EPACT 2005, provides an opportunity to establish a viable path forward for deploying advanced nuclear energy technologies